

CLAIMS

That which is claimed is:

1. A component comprising:
 - a bladder formed of a barrier material, the bladder enclosing a fluid that exerts an outward force upon the barrier material; and
 - a reinforcing structure at least partially recessed into the barrier material and bonded to the barrier material, at least a portion of the reinforcing structure being placed in tension by the outward force upon the barrier material.
2. The component recited in claim 1, wherein the bladder includes a first surface, an opposite second surface, and a sidewall extending between the first surface and the second surface..
3. The component recited in claim 2, wherein a plurality of interior bonds join the first surface with the second surface, the interior bonds being spaced inward from the sidewall.
4. The component recited in claim 2, wherein the reinforcing structure has a first portion, a second portion, and a plurality of connecting portions extending between the first portion and the second portion.
5. The component recited in claim 4, wherein the first portion is secured to the bladder at an interface between the first surface and the sidewall, and the second portion is secured to the bladder at an interface between the second surface and the sidewall.
6. The component recited in claim 4, wherein the connecting portions are at least partially recessed into the sidewall and bonded to the sidewall.
7. The component recited in claim 1, wherein a material forming the reinforcing structure has a greater modulus of elasticity than a material forming the bladder.

8. The component recited in claim 1, wherein the bladder includes a first chamber and a separate second chamber with different pressures.
9. The component recited in claim 1, wherein the reinforcing structure is formed of at least two different materials.
10. A component comprising:
 - a bladder formed of a flexible barrier material that encloses a pressurized fluid; and
 - a reinforcing structure extending around at least a portion of the bladder and at least partially recessed into the barrier material, the reinforcing structure being formed of a semi-rigid material that is bonded to the bladder.
11. The component recited in claim 10, wherein the pressurized fluid exerts an outward force upon the barrier material.
12. The component recited in claim 11, wherein at least a portion of the reinforcing structure is placed in tension by the outward force upon the barrier material.
13. The component recited in claim 11, wherein the reinforcing structure restrains distension of the barrier material due to the outward force upon the barrier material.
14. The component recited in claim 11, wherein the bladder includes a first surface, an opposite second surface, and a sidewall extending between the first surface and the second surface.
15. The component recited in claim 14, wherein the reinforcing structure restrains distension of the sidewall due to the outward force upon the barrier material.
16. The component recited in claim 14, wherein a plurality of interior bonds join the first surface with the second surface, the interior bonds being spaced inward from the sidewall.

17. The component recited in claim 16, wherein the interior bonds restrain distension of the first surface and the second surface due to the outward force upon the barrier material.

18. A component comprising a bladder formed of a barrier material that encloses a fluid, the bladder including a first surface and an opposite second surface, the first surface and the second surface being joined through an interior of the bladder by a plurality of interior bonds, and the bladder including at least one flexion indentation formed in the second surface such that a space is formed between the indentation and the first surface, the space including the fluid, and at least one of the interior bonds extending through the space to join the first surface with the indentation.

19. The component recited in claim 18, wherein the interior bonds are spaced inward from a sidewall of the bladder.

20. The component recited in claim 18, wherein an elevation of the interior bonds with respect to the first surface and the second surface varies.

21. The component recited in claim 18, wherein the bladder is formed of a first barrier layer and a second barrier layer, the first barrier layer forming the first surface, and the second barrier layer forming the second surface.

22. The component recited in claim 21, wherein the first barrier layer is secured to the second barrier layer to form a peripheral bond positioned at an interface of a sidewall and the second surface.

23. The component recited in claim 18, wherein a reinforcing structure is secured to the bladder and extends at least partially around the bladder.

24. The component recited in claim 23, wherein the bladder includes depressions, a portion of the reinforcing structure being positioned within the depressions and bonded to the depressions.

25. The component recited in claim 18, wherein the bladder includes at least two chambers, and the fluid within the two chambers exhibit different fluid pressures.

26. A method of manufacturing a fluid-filled component, the method comprising steps of:
molding a bladder from a polymer material;
recessing a reinforcing member into the bladder; and
bonding the reinforcing member to the bladder.

27. The method recited in claim 26, further including a step of pressurizing an interior of the bladder.

28. The method recited in claim 26, wherein the step of molding includes selecting the polymer material to be two thermoplastic polymer sheets.

29. The method recited in claim 28, wherein the step of molding includes selecting the two thermoplastic polymer sheets to have different thicknesses.

30. The method recited in claim 28, wherein the step of molding includes stretching the two thermoplastic polymer sheets.

31. The method recited in claim 28, wherein the step of molding includes forming a first surface and a sidewall of the bladder from a first of the two thermoplastic polymer sheets.

32. The method recited in claim 31, wherein the step of molding includes forming a second surface of the bladder from a second of the two thermoplastic polymer sheets.

33. The method recited in claim 32, wherein the step of molding includes forming a peripheral bond between the two thermoplastic polymer sheets, the peripheral bond being positioned at an interface of the sidewall and the second surface.

34. The method recited in claim 26, wherein the step of molding includes selecting the polymer material to be a polymer parison.

35. The method recited in claim 26, wherein the step of molding includes forming a plurality of interior bonds that join a first surface of the bladder with a second surface of the bladder.

36. The method recited in claim 26, wherein the step of recessing includes forming depressions in the bladder that receive the reinforcing member.

37. The method recited in claim 26, wherein the step of recessing includes forming an outwardly-facing surface of the bladder to be flush with an outwardly-facing surface of the reinforcing member.

38. The method recited in claim 26, further including a step of positioning the reinforcing member within a mold prior to the step of molding.

39. The method recited in claim 26, further including a step of beveling an edge of the reinforcing member.

40. A method of manufacturing a component, the method comprising steps of:
locating a reinforcing member within a first mold portion of a mold;
positioning a first sheet and a second sheet of polymer material between the first mold portion and a second mold portion of the mold;
drawing the first sheet against a surface of the first mold portion and against a surface of the reinforcing member to recess the reinforcing member into the first sheet and bond the reinforcing member to the first sheet;
drawing the second sheet against a surface of the second mold portion; and
forming a peripheral bond between the first sheet and the second sheet by compressing the first sheet and the second sheet between the mold portions.

41. A component comprising:
 - a bladder formed of a barrier material that encloses a fluid, the bladder having a first visual property; and
 - a reinforcing structure bonded to the barrier material, the reinforcing structure having a second visual property that is different from the first visual property.
42. The component recited in claim 41, wherein the first visual property and the second visual property are colors of the bladder and the reinforcing structure.
43. The component recited in claim 41, wherein the first visual property and the second visual property are clarities of the bladder and the reinforcing structure.
44. The component recited in claim 41, wherein the reinforcing structure is at least partially recessed into the barrier material.
45. The component recited in claim 41, wherein the fluid exerts an outward force on the barrier material, and at least a portion of the reinforcing structure is placed in tension by the outward force.
46. The component recited in claim 41, wherein materials forming the bladder and the reinforcing structure have different mechanical properties.